

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Xie, et al. )  
Serial No.: Not yet assigned (CON of 09/432,382) ) Group No.: Not yet assigned  
Filed: July 16, 2001 ) Examiner: Not yet assigned  
For: Compact Polarization Insensitive Circulators )  
with Simplified Structure and Low Polarization )  
Mode Dispersion )

Commissioner for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Before action on the merits, please consider the following amendments and remarks.

**Before Field of Invention:**

At page 1, line 6, please add a paragraph to read as follows:

**Related Applications:**

This application is a continuation of serial no. 09/432,382, filed 10/29/1999, which is fully incorporated herein by reference.

**IN THE CLAIMS:**

Please cancel claims 1-40 without prejudice.

Please insert claims 41-58 as follows:

41. A method of tuning a spatial separation between a first optical port of an optical circulator and a third optical port of the optical circulator comprising:

providing the optical circulator, and the optical circulator having a longitudinal axis, and the optical circulator comprising a first optical port located at an end of the optical circulator, a second optical port located at a distal end of the optical circulator from the first optical port along the longitudinal axis, a third optical port located at the same end of the optical circulator as the first optical port, a first beam angle turner located along the longitudinal axis between the first optical port and the second optical port; and a second beam angle turner located along the longitudinal axis distally from the first beam angle turner, and the first beam angle turner and the second beam angle turner being separated by a complete gap; and

adjusting a length of the complete gap causing a corresponding adjustment in a spatial separation between a first light beam travelling from the first optical port to the second optical port and a second light

12 beam travelling from the second optical port to the third optical port, wherein the location of the first light  
13 beam and the second light beam define the location of the first optical port and the third optical port.

1 42. The method of claim 41, wherein the first beam angle turner or second beam angle turner comprises a  
2 Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a pair of  
3 birefringent wedges separated by a complete gap.

1 43. The method of claim 41, wherein each of the first beam angle turners or second beam angle turners  
2 comprise two or more Rochon prisms, Wollaston prisms, modified Rochon prisms, modified Wollaston  
3 prisms, or a pair of birefringent wedges separated by a complete gap.

1 44 The method of claim 41, wherein the optical circulator comprises a polarization mode dispersion free  
2 optical circulator.

1 45. The method of claim 41, wherein the optical circulator comprises a four or more optical ports.

1 46. A method of transmitting an optical beam comprising:  
2 passing the optical beam through a nonreciprocal optical device comprising a first beam angle turner  
3 and a second beam angle turner, wherein an e-ray and an o-ray of the optical beam propagate through both the  
4 first beam angle turner and the second beam angle turner; and

5 wherein any polarization rotators of which the nonreciprocal optical device may be comprised are  
6 nonreciprocal polization rotators.

1 47. The method of claim 46, wherein the first beam angle turner or second beam angle turner comprises a  
2 Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a pair of  
3 birefringent wedges separated by a complete gap.

1 48. The method of claim 46, wherein the optical circulator comprises a polarization mode dispersion free  
2 optical circulator.

1 49. The method of claim 46, wherein the optical circulator comprises a four or more optical ports.

1 50. An optical circulator comprising:  
2 a nonreciprocal optical device comprising a first beam angle turner and a second beam angle turner,  
3 wherein an e-ray and an o-ray of the optical beam propagate through both the first beam angle turner and the  
4 second beam angle turner; and

5 wherein any polarization rotators of which the nonreciprocal optical device may be comprised are  
6 nonreciprocal polarization rotators.

1 51. The optical circulator of claim 50, wherein the first beam angle turner or second beam angle turner  
2 comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a  
3 pair of birefringent wedges separated by a complete gap.

1 52. The optical circulator of claim 50, wherein the optical circulator comprises a polarization mode  
2 dispersion free optical circulator.

1 53. The optical circulator of claim 50, wherein the optical circulator comprises a four or more optical  
2 ports.

1 54. An optical circulator, and the optical circulator having a longitudinal axis, and the optical circulator  
2 comprising a first optical port located at an end of the optical circulator, a second optical port located at a  
3 distal end of the optical circulator from the first optical port along the longitudinal axis, the third optical port  
4 located at the same end of the optical circulator as the first optical port, and the optical circulator comprising:

5 a first beam angle turning means located along the longitudinal axis between the first optical port and  
6 the second optical port, for turning a beam through an angle;

7 a second beam angle turning means located along the longitudinal axis distally from the first beam  
8 angle turner, for turning a beam through an angle, and the first beam angle turning means and the second  
9 beam angle turning means being separated by a complete gap; and

10 means for adjusting a length of the complete gap causing a corresponding adjustment in a spatial  
11 separation between a first light beam travelling from the first optical port to the second optical port and a  
12 second light beam travelling from the second optical port to the third optical port, wherein the location of the  
13 first light beam and the second light beam define the location of the first optical port and the third optical port.

1 55. The optical circulator of claim 54, wherein the first beam angle turning means or second beam angle  
2 turning means comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston  
3 prism, or a pair of birefringent wedges separated by a complete gap.

1 56. The optical circulator of claim 54, wherein each of the first beam angle turning means or second beam  
2 angle turning means comprise two or more Rochon prisms, Wollaston prisms, modified Rochon prisms,  
3 modified Wollaston prisms, or a pair of birefringent wedges separated by a complete gap.

1 57. The optical circulator of claim 54, wherein the optical circulator comprises a polarization mode  
2 dispersion free optical circulator.

1 58. The optical circulator of claim 54, wherein the optical circulator comprises a four or more optical  
2 ports.--

### **CONCLUSION**

It is submitted that the present application is in form for allowance, and such action is respectfully requested. Any questions can be asked of the undersigned at telephone number (650) 849 3438.

The Commissioner is authorized to charge any additional fees which may be required, including petition fees and extension of time fees, to Deposit Account No. 23-2415 (Docket No. 10629-802).

Respectfully submitted,

WILSON SOXSINI GOODRICH & ROSATI

Date: \_\_\_\_\_

8/31/01



David J. Abraham, Reg. No. 39,554

650 Page Mill Road  
Palo Alto, CA 94304  
(650) 493-9300  
Customer No. 021971